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Inflation in cosmological models with a nonminimally coupled, massless scalar field

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Abstract

A homogeneous, spatially flat cosmological model induced by a massless scalar field is investigated. The parameter ξ of coupling of the field with the curvature can take any value. It is shown that the range of values of ξ is divided into three regions, $\xi < 0$, $0 < \xi < 1/6$, and $\xi > 1/6$, each of which is characterized by the behavior of the scale factor in it. The points $\xi = 0$ and $\xi = 1/6$ are singular. Stages with exponential and power-law inflation are found in the ranges $0 < \xi < 1/6$ and $\xi > 1/6$. An exponential inflationary stage with acceptable cosmological consequences can occur for small positive ξ.